THE FARM INDEX

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The American Farmer

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Salutation

This issue gives birth to a series of articles celebrating the Bicentennial. We have named it "The American Farmer."

If the title is lacking in imagination, it is because the feats of the American farmer are not imaginary. His is not a make-believe tale but a real-life story that begins with toil and ends with hard work. In between we read a novel about agriculture that no other nation is privileged to write.

The Farm Index is fortunate to have some of the finest talents in ERS to contribute to this series, although the research itself represents the efforts of hundreds of our specialists, of other USDA agencies, land grant colleges, as well as experts long since gone.

The first article spans 200 years. It speaks of the technological, structural, social, and policy changes that made the American farmer the world's most productive and efficient.

Future articles will cover land and water resources, our farm production plant, education, rural living, farm markets, the consumer, the role of Government, agriculture in the environment, in a world setting, and in the economy.

Who is the American farmer? We trust this collection will provide some answers. We hope too this series will engender a richer understanding by the public of the American farmer's problems and his vital contribution to their daily lives.—The Editors.

The American Farmer: The First 200 Years

Today's American farmer little resembles his colonial ancestor of 2 centuries ago. He heads a commercial enterprise his forefathers couldn't have imagined. Yet the resources, institutions, and technology that make American agriculture the world's most productive trace directly back to our early beginnings.

Nature richly endowed American agriculture. A wide range of productive land and climate permit production of virtually every agricultural commodity except some tropical fruit and vegetables, fibers, and spices.

Equally important, Americans have always been receptive to technological innovations that increase produc-

tion and reduce physical labor. The farmer is no exception.

The rate at which innovations have been introduced has vastly increased in the last 3 decades. In contrast to earlier times when inventions or improved practices tended to be adopted one-at-a-time, today's farmer is using a "systems" approach to increase agricultural productivity.

Potpourri of progress. The package of improved practices on typical modern farms includes tractors and other machines; improved and hybrid seeds and livestock; fertilizer; productive use of water through irrigation and drainage; the application of chemicals to control weeds, fungi, and insects; the widespread use of conservation practices; and the balanced feeding of livestock.

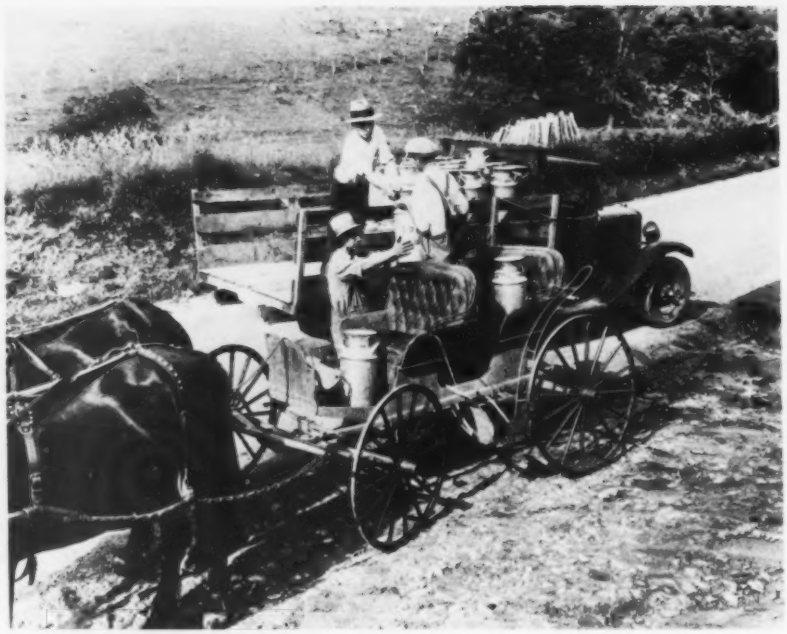
Agriculture sometimes reaches into other fields for advanced technology to solve a problem. A recent example is the conquest of the screwfly, a cattle pest, by using irradiation to sterilize the male insects.

One result of the technological changes in agriculture was a dramatic drop in the proportion of the Nation's work force needed to produce food and fiber. In 1974, only 4 percent of the Nation's labor worked in farming compared with 20 percent in 1935. In 1776, it was 90 percent.

Another indication is that since 1935, the number of people living on farms has dropped from 32 million to a little over 9 million. Meanwhile, the number of farms has fallen from almost 7 million to less than 3 million.

Going commercial. Increased reliance on technology has meant that today's farmer must buy more of the things needed for production from industry or other farmers than his dad did. He also sells a much larger share of the output of his farm. Except for the subsistence farmer on one hand and the gentleman farmer on the other, he's a commercial operator, producing for the market.

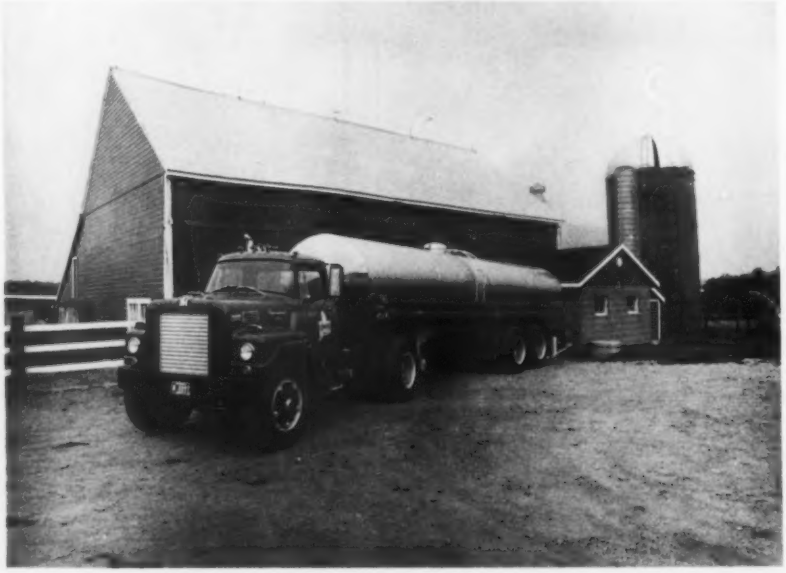
Furthermore, his market is no longer just down the road to the closest town. It's also national and international. Demands vary from year to year, and largely because of changes in foreign requirements. This broadening of the market has opened up opportunities for the farmer, but also exposed him to some problems.



Metal milk cans, time-honored symbol of the American dairy, are lifted onto a local delivery truck to be hauled away for processing.

Ideally, farmers together should produce the exact amount each year that would meet the market demands and, at the same time, yield fair returns for labor and investment. But variations in weather, combined with an unpredictable foreign demand and

Bulk trucks, which pump milk directly from a dairy's refrigerated storage tank, form the modern link between producer and processor.



the fact that each farmer makes up his own mind about what he will plant, have brought problems of alternating surpluses and shortages.

Help from the Government. Thus, the Federal Government has helped the farmer adjust to these problems, beginning in 1929 with the Agricultural Adjustment Act and continuing with the Agricultural Adjustment Acts of 1933 and 1938.

The shortages of World War I were not severe and were handled by voluntary programs. Those of World War II were handled by allocation and rationing. In both instances, farmers responded with increased production, but then suffered for it when foreign demand slackened and prices dropped sharply.

Then during the 1950's and 1960's, programs were developed to aid foreign nations and our own disadvantaged people by sending them our food surpluses.

In 1972-73, however, the surpluses disappeared on the heels of worldwide weather disasters and increased foreign commercial demand for American products. By 1974, when famine again hit several nations in Asia and Africa, the U.S. faced demands it could not meet, driving food prices higher and higher in the grocery stores. Government controls on production were removed in 1973 and 1974 but bad weather in 1974 drove crop production down. Given halfway decent growing weather, however, there is every reason to believe that the shortages will be only temporary.

Sustained growth. Such belief, and optimism over agriculture's ability to produce, is grounded in historical fact. U.S. farm output has increased by a fourth since 1960, by a half since 1950. And it's doubled since the 1930's, and nearly tripled since the start of the 20th century.

The roots of this almost constantly increasing production go back to the American Revolution. Among the causes of the Revolution were British controls over trade in colonial farm products and restrictions on expansion to new farmlands in the West.

The land question was tackled by the new Nation soon after it won its independence and before it adopted the Constitution. The Ordinance of 1785 provided for surveying the West into townships, each containing 36 sections of 1 square mile, and then offering them at auction. One section in each township was reserved for public schools.

The Ordinance of 1787, one of the most important laws ever passed in the U.S., provided for dividing the old Northwest into territories that would become States on equal terms with the original States when population reached a certain level. Settlers were protected by a bill of rights and slavery was prohibited. The genius of the ordinance lay in

A Bountiful Land

The land area of the United States —Alaska to Hawaii, Minnesota to Florida, Maine to California—totals over 2 billion acres. About one-half is in farms, of which two-fifths is cropland. About 40 million acres are irrigated. The other half is in pasture and range, woodland, and wasteland.

Our climate ranges from the subtropical in the extreme South to the long, cold winters of the North. Rainfall varies from almost nothing in the southwestern deserts to near 60 inches in the southern coastal areas. The midwestern agricultural area receives from 30 to 45 inches a year.

Along the eastern coastal plain, the land flattens out. The sandy soil is suitable for crop and forest production. Toward the Appalachian Mountains to the west, the land is mostly in grain, open fields, pastures and forests. West of the Appalachians, the land slopes to the Ohio, Mississippi and Missouri Rivers, and the highly productive Central Plains.

Further west, in the Great Plains, the rainfall is low and the treeless land is used for grazing livestock and growing wheat and other grain. The land between the Rocky Mountains and the Pacific Coast is arid, although a number of irrigated valleys are very productive. The West Coast, with irrigation in the south and heavy rainfall in the north, produces fruits and vegetables, including citrus fruit in California, as well as specialty crops.

The center of corn and hog production lies in the upper Mississippi Valley, while soybeans are grown throughout the Valley. Wheat farming is concentrated in the Great Plains and Pacific Northwest. Cotton is grown in the South and Southwest, and tobacco and peanuts in the Southeast. Broilers and timber for pulpwood are also produced in the South. Vegetables are grown almost everywhere, with concentrations on the Atlantic and Pacific coasts and in irrigated southwestern valleys. Sugarcane is centered in Hawaii, Louisiana, and Florida, while sugarbeets are grown mainly in the West.

Fruits and nuts grow in a number of areas, though commercial citrus production is limited to Florida, California, Texas, and Arizona. Dairying is important in the North Central and Northeastern States, partly because of the large population there and partly because dairying is one of the most efficient uses of the land. Most beef cattle are raised in the High Plains and then fattened either there or in the North Central States.

Sheep production also is centered in the Plains. There is poultry production throughout the country, with many egg producing centers around urban areas. Broiler production is more concentrated in the South, from Delaware to Arkansas. Turkeys are produced in many States, with California, Minnesota, Missouri, Texas, and North Carolina the leaders.

preventing what could have become a "colonial" problem by providing for the equality of new States.

Developments in Dixie. In the South, the settlers were, at first, frontiersmen, whose farms were patches of corn and beans and homes for a few hogs. In those early times, there seemed little likelihood that slavery would prove profitable in the South. In fact, it appeared that slavery might be coming to an end because of a decline in the demand for American tobacco.

However, in 1793, Eli Whitney, a young graduate of Yale University, invented a practical cotton gin, which separated the seeds from the lint of short-staple cotton quickly and at a low cost. His invention made slavery profitable, encouraged planters to move west, and made cotton the preeminent agricultural export of the new Nation.

The northern frontier was characterized by small farmers who practiced a self-sufficient agriculture, though cattle raised in the Ohio River Valley were driven to eastern markets. Later, wheat became the main cash crop, encouraged by the opening of the Erie Canal in 1825.

A time for invention. The particular cultivation needs in the prairies led farmers and blacksmiths to invent new tools and machines. Two Illinois blacksmiths, John Lane and John Deere, separately used steel for the shares and moldboards of plows. These plows efficiently turned the sticky prairie soil, which had tended to cling to the conventional wooden or iron plows.

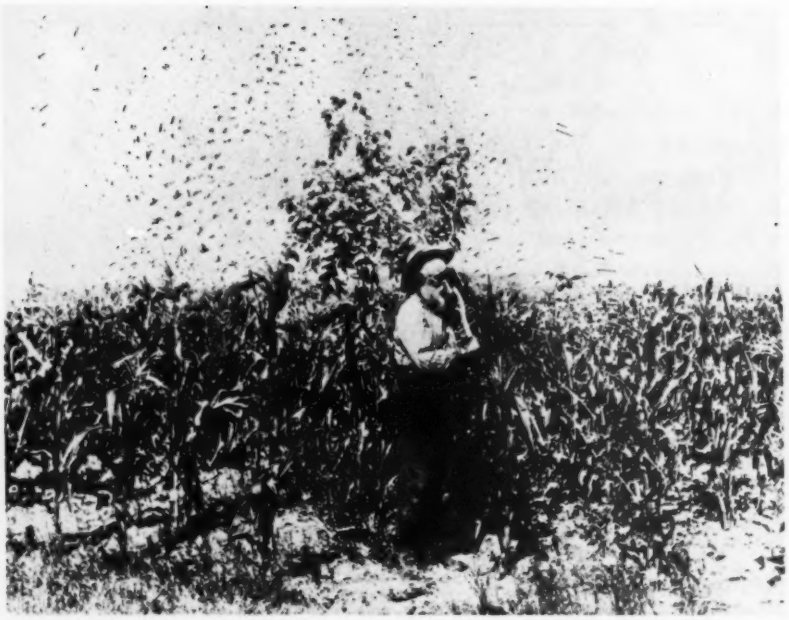
The critical point in raising wheat was the harvesting of the ripe grain before it was lost through rain, hail, or wind. For centuries, men and women had worked in the harvest with scythes and sickles, just as many farmers of the world still do. In 1831, Cyrus H. McCormick of Virginia built a workable, horse-drawn grain harvester. At about the same time, Obed Hussey of Cincinnati built a similar machine. Over the years, McCormick came to dominate the market, partly because he moved his factory to Chicago, the future grain marketing center, while Hussey began production in Baltimore.

With only horse-drawn implements to aid, potato harvesting was back-breaking work at the turn of the century.

Other important machines powered by horses were invented, including the grain drill, cultivator, mower, and threshing machine. These inventions marked the beginning of the first great "agricultural revolution" in the U.S.—the change from hand to horse-powered equipment accompanied by a transition from self-sufficient to commercial agriculture in the North.

The changes got under way slowly, though. Many farmers either lacked the capital or were unwilling to risk the little money they had to buy the new machines. Then the Civil War brought labor shortages, strong de-

Now fully mechanized, potato harvesting requires hand labor only to sort out rocks and other debris.



An early-day midwestern farmer resorts to hand combat to save his field from grasshoppers.

mand, and high prices for farm products. Adoption of the new technology caught on fast in the late 1860's and the early 1870's.

Key legislation. The transition was encouraged by four major laws signed by President Abraham Lincoln. They were: the Homestead Act, granting 160 acres of land to western settlers; the Morrill Land Grant College Act, granting public land to each State for a college to teach agriculture and mechanical engineering; the act establishing USDA; and an act granting land to build a transcontinental railroad. The land grant colleges were later strengthened by the Hatch Experiment Station Act of 1887, providing for an agricultural experiment station in each State.

Aerial spraying, dusting, and fogging help today's farmer in the never-ending struggle against pests and disease.

The first American agricultural revolution and the continued settlement of new land led to a marked increase in total production—doubling between 1870 and 1900.

Farm prices declined between 1870 and 1900 as surpluses developed, picked up between 1900 and World War I, increased sharply during the war, and then declined as sharply during the 1920's. The Nation continued to be a major exporter of agricultural products until after World War I. These sales provided a substantial part of the foreign exchange needed by our developing industry. Exports were low during the 1920's and 1930's but picked up during World War II and have been substantial ever since.

USDA responds. The agricultural depression of the 1920's led to many proposals to help the farmer. Within USDA, the Bureau of Agricultural Economics was established in 1922 to bring economic knowledge to bear on farm problems. The Extension Service had been established earlier, in 1914, to carry scientific knowledge directly to the farmers.

Much of the early work of the agricultural economists and of the extension agents was devoted to the individual farmer. The farmer could be helped to manage his farm carefully, cutting unnecessary expenses but growing as much as possible of needed crops, so that he might prosper in spite of low prices. Farm management studies were made and situation and outlook conferences were held to help the farmer make profitable decisions.

In many parts of the Nation, nature seemed to join forces with the economic depression against the farmers. In the early 1930's a series of droughts turned part of mid-America into a dust bowl. Thousands of farmers and their families left Oklahoma, Texas, and other States in the hope of finding jobs in California.

Cooperative approach. Farm organizations urged farmers to join both purchasing and marketing cooperatives. If farmers bought through co-

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Milestones in American Agriculture

- 1793 • Eli Whitney invented cotton gin.
- 1825 • Erie Canal completed, opening western farmlands to European markets.
- 1833 • McCormick reaper patented.
- 1837 • Steel plows used in the prairies.
- 1849 • Mixed fertilizers first manufactured commercially.
- 1862 • Morrill Land Grant College Act gave land to each State for colleges to teach agriculture and mechanical arts; Homestead Act gave 160 acres of Federal land to each settler; Transcontinental Railroad Act granted land and cash for building Union Pacific Railroad.
- 1867 • Founding of National Grange, first nationwide farm organization.
- 1875 • First State-supported agricultural experiment station established.
- 1892 • Successful gasoline tractor built.
- 1914 • Smith-Lever Act formalized cooperative extension work on a national basis.
- 1916 • Federal Farm Loan Act guaranteed payments of certain loans made to farmers.
- 1926 • Hybrid corn seed became commercially available.
- 1927 • Mechanical cotton picker invented.
- 1933 • First Agricultural Adjustment Act authorized voluntary production adjustments, marketing agreements, and price supports for farm products.
- 1935 • Rural Electrification Administration established to make loans to rural cooperatives for farm electrification.
- 1937 • Farm Security Administration, later succeeded by the Farmers Home Administration, established to help farm workers acquire their own land and to encourage the development of efficient farms.
- 1949 • "Package of agricultural practices" concept showed greater gains in production when a number of improved inputs, such as better seeds, fertilizers, machinery, and irrigation, were used together.
- 1954 • Public Law 480 authorized use of surpluses for foreign relief and development.
- 1961 • Introduction of Gaines short-stem wheat, which permitted big increases in output through the use of fertilizer and irrigation.
- 1973 • Agriculture and Consumer Protection Act geared price supports for wheat, cotton, and feed grains to market prices.
- 1974 • World Food Conference in Rome drew attention to the need for improved agriculture throughout the world and for the better distribution of food.

A grocery store in the 1880's offered only staples and basic household items, but lots of town gossip.

operatives, they could benefit from quantity discounts, while if they sold cooperatively, they could bargain more effectively. A high point in assistance to cooperatives came with the passage of the Agricultural Marketing Act of 1929. This law established the Federal Farm Board to help cooperatives and corporations stabilize the price of cotton and wheat. Alas, the worsening economic situation doomed these stabilization efforts to failure.

By the early 1930's, the Nation found itself in the paradox of having great surpluses of farm commodities, while city dwellers could not afford the food they needed. Some farmers, faced with the loss of everything they had, were on the verge of armed revolt.

The Agricultural Adjustment Act, signed in 1933 by President Franklin D. Roosevelt, gave the Secretary of Agriculture authority to reduce acreage or production by voluntary agreements, to enter into marketing agreements with processors to control prices paid producers, and to license processors and others with the aim of eliminating unfair practices. Farmers could receive rental or benefit payments, and the Department could spend money to expand markets or remove surpluses. These activities were to be financed by a processing tax.

Then in 1936 the Supreme Court invalidated the production control provisions of the Agricultural Adjustment Act, in the Hoosac Mills decision.

Toward balanced abundance. Subsequently a farm law was passed which, with many modifications, remained the Nation's basic agricultural price support and adjustment law into the 1970's. It was the Agricultural Adjustment Act of 1938. It stressed an "ever-normal granary" plan of balanced abundance, with loans, acreage allotments, and marketing quotas for "basic" crops, and a goal of "parity" prices and incomes for farmers. Consumers were to be protected, and soil conservation was a major objective.

World War II led directly to the second American agricultural revolution—a technological eruption. This developed as a result of higher prices during the war, high levels of price support guaranteed for 2 years after the war's end, a seemingly unlimited demand for farm products, shortage of farm labor, and appeals by the Government to increase production.

Machinery moves to the fore. This second technological revolution saw virtual completion of the changeover from animal to mechanical power. The number of tractors on farms more than doubled between 1940 and 1950, even though the number of farms declined. By 1954, there were more tractors than horses and mules on farms. The tractor permitted mechanization of many other operations—tomato production and hay making, for example.

Foundations for the second revolution had been laid in preceding decades. New crops, breeds of livestock,

Though more impersonal than its forerunner, the modern supermarket offers shoppers streamlined service and 7,000 to 8,000 items.

America's First Farmers

When Europeans first arrived in what is now the U.S., they found the native American Indians getting their food by farming, hunting, fishing, and gathering wild seeds and berries. Farming, both in extent and in what was produced, varied from tribe to tribe. But corn, or maize, was the crop basic to virtually all Indian farming.

First domesticated in Mexico, corn then spread north and south until it was grown in every section of the country. English settlers in both Jamestown and Plymouth were saved from starvation when friendly Indians taught them how to grow corn. This meant planting the seeds 3 inches deep instead of sowing them broadcast as was done with English grain.

The Indians cleared land for their corn by girdling the trees—cutting through the bark all the way around—until the trees died. Later the Indians removed the dead trees by burning them.

In many areas the Indians planted beans, squashes, and pumpkins with the corn. Strawberries and the Jerusalem artichoke were also cultivated. Had it not been for their natural abundance, blueberries, cranberries, and wild rice probably would not have been domesticated. While the potato, sweet potato, manioc, and pineapple were all domesticated by the Indians, these crops were not grown north of Mexico until after the Europeans arrived.

Tobacco was raised by Indians throughout the New World, and it quickly became the most important cash crop in colonial America. Several varieties of cotton were used by the Indians in pre-Columbian times. One of them is the basis for our short-staple cotton crop.

About half of today's total agricultural production in the U.S., measured in farm value, comes from plants domesticated by America's first farmers—the American Indians.

laborsaving machinery, and improved methods were available to farmers in the 1920's and 1930's. Lighter, more efficient tractors were introduced in the mid-1920's. Hybrid corn became commercially available in 1926. A mechanical cotton picker was patented in 1927. Meat-type hogs were developed by the experiment stations in the 1930's.

As in the period before the Civil War, however, many farmers in the 1930's lacked the capital or were reluctant to try new crops and methods with no assurance of gain and the possibility of losses. As Sherman Johnson wrote in 1950, ". . . the production-increasing potentialities of improvements that were made over a decade, and that normally would have been diverted gradually into the production stream, were held back by the drought and depression of the 1930's."

Postwar progress. Conditions continued favorable to adoption of technology after the war. Continued demand for food for foreign relief and Governmental price supports encouraged farmers to greatly increase their use of mechanical power and machinery, fertilizer, feed and seed, and other production items. And these became readily available when the shooting stopped. Industry, the State experiment stations, and the Department of Agriculture continued with research that would increase productivity per man-hour, per acre, and per unit of means of production or inputs. Innovations were adopted by farmers almost as soon as they came off the experimental plot.

The adoption of technology in the second agricultural revolution resulted in sharp gains in production, despite 50 million fewer acres of cropland and 9 billion fewer hours of labor being used. The following index numbers (1967=100) give an idea of the sharp changes:

	1950	1973	% change
Total farm output	74	112	+52
Output per unit of input	73	106	+45
Farm production per hour of farm labor.	34	129	+279
Land used for crops ..	111	104	—6
Labor used in farming	215	87	—60

In a pinch. The farmer's dependence on technology to produce for the market makes him very susceptible to what has been called the "cost-price" squeeze. The costs of what he has to buy have tended to rise faster than the prices he has received for what he sells. Even in such a period as 1973-74, when farm prices rose dramatically, costs of fuel and fertilizer rose even faster. And the increases in the price of feed grains hit the poultry producer, the dairyman, and the cattle feeder, causing them to cut back.

Even so, since World War II farmers who adopted the new technology, increased the size of their farms, and produced for the market—that is, commercial farmers—experienced a general upward trend in income and a rising standard of living.

While becoming a crucial part of the commercial world, though, they

continued to hold to traditional rural values. Most farmers believe that farming is essential to the well-being of the Nation, that it permits independence, and that it provides a favorable environment for the family.

Looking ahead. Potentials for further increasing crop and livestock production over the next decades include wider application of high-level management skills; hybrid varieties of wheat, barley, and soybeans; higher protein content in grains; insect-resistant plant varieties; improved breeding practices for beef cattle; multiple births in beef cattle; greater feeding efficiency; and double cropping.

Although many people have differing opinions as to the future of American agriculture, Theodore C. Byerly, an eminent scientist, wrote in 1970—"Continuing development and application of technology in production of food, fiber, and forest products can supply the next generation abundantly."

Some forecasters see all farming in the hands of a few corporations by the year 2000, with practices being almost entirely mechanized.

However, farm population and employment have tended to stop declining for the past several years. And judging by farm financial data, farmers remain in good shape with their bankers. Furthermore, an indication that the independent farm family—whether organized for business purposes as a corporation or not—will be tough to buy out is the soaring price of farmland. It rose a fifth nationally in 1974.

Other forecasters predict increased irrigation, soilless or hydroponic farming, the desalting of sea water, the use of plankton as food, and the growing of edible protein on petroleum as necessary to meet the demands of the future.

Historically, changes in farming over the past 200 years have been so great that the Revolutionary War soldier-farmer would recognize only a few of the tools and none of the machines on today's farm.

A set pattern. If there is a third agricultural revolution it will likely be in the tradition of the first two—a major change in sources of power. It may well be a change from machines powered by fossil fuel—gasoline and diesel oil—to machines powered by effective small solar or atomic engines. However, while changes will continue in the future, our first 200 years have set a pattern. Food will still be produced primarily on the land by farmers responsible for their own decisions.

[Based on special material by Wayne D. Rasmussen, Agricultural History Group.]

The Farmer & the Revolution

Farmers led the American Revolution, fought its battles, and supplied its armies with food. George Washington, a Virginia planter, was the military leader of the colonists. Thomas Jefferson, also a Virginia planter, and Henry Laurens, a South Carolina planter, helped provide political leadership.

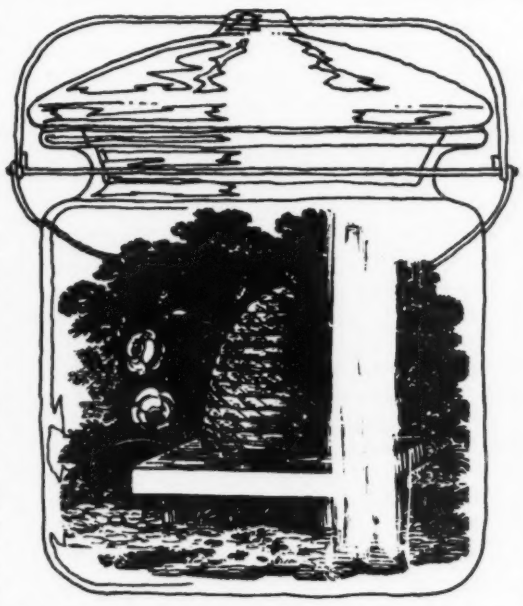
In 1775, farmers made up over 90 percent of the population of the colonies. Several acts of Great Britain over a period of years antagonized most of this group.

Southerners resented the laws requiring that their tobacco and indigo be shipped to Great Britain, while Northerners felt penalized when the British cut off their markets for livestock and grain in the Spanish and French West Indies. High taxes on foreign sugar and molasses hit everyone. And most farmers and planters resented the Proclamation Act of 1763, which prohibited settlement west of the Allegheny Mountains.

When the time for decision came, both the Continental Congress and the Continental Army were largely made up of, and acting for, the planters and farmers of the new Nation.

Astride his turn-of-the-century thresher, a Washington wheat farmer watches as the machine separates grain from chaff.

Four combines cut a quick swath through a field of grain sorghum in this typical harvest scene on the Texas High Plains.



THE HEALTH FOOD QUESTION

Are those tomatoes in your local health food store really "organically grown"? Are they more nourishing than the supermarket variety? Answers are hard to find.

What's the story on health foods? As their popularity has increased, so have the questions about them.

What exactly are health foods and where do they come from? Do they cost more than the standard fare and are they actually better for you? Are there legal checks on health food claims?

It's tough to come up with solid answers. The rise of health foods was so sudden that research on the subject lags behind public interest.

There is either scant information or outright disagreement on health foods' definition, cost, and quality, and on regulation by the Government.

Elusive definition. Health foods have been on the market for decades, but at this time it is still hard to find a working definition for the term "health food," or a good estimate of the size of the market.

"Everybody eats food for their health," says one food specialist with ERS. "You wouldn't intentionally eat anything that isn't healthy, would you?"

He would prefer less general terms, like "natural" or "organic," but even then you run into definition problems.

Within the health food industry, "natural" pertains to foods that have no additives. "Organic" is more precise—it refers to foods that not only have no additives, but are also grown without chemical fertilizers or pesticides.

Congress and the Food and Drug Administration (FDA) have tried for years to draft legislation to set standards for the labeling of organic foods, but they've been slowed by controversy over what the term really means.

Some food industry people fear that a federally approved "organic" label on a food item might imply superiority, which, they stress, is not necessarily the case.

Strong sales record. For better or worse, there is no question that health food sales have soared in the past decade. USDA observers estimate that the market has jumped about 100 percent in 10 years.

But the health food market is still too small, they say, to warrant extensive study. How small? Again, definition is an added problem. If health food sales include those by the many new vitamin stores, the industry claims about 5 percent of the total food market. Disregarding vitamins, guesses drop to 1 to 3 percent.

Some USDA observers think that the health food surge is leveling off. They cite the rising cost of foods in general, saying that consumers can't afford the higher price of health foods.

The other side. A spokesman for the Rodale Press in Pennsylvania, a leader in the health food industry, disagrees. He asserts that the popularity of health foods will continue to mount. He says that farmers are finding less expensive ways to grow organically, so organic food prices will not rise as rapidly as regular foods.

He estimates that there are be-

tween 3,000 to 3,500 health food stores in the U.S., but that the vast majority specialize in vitamins "with some food on the side." But he adds that the number of stores selling only natural and organic foods is on the upswing.

For the most part, these stores get their products from small farmers who raise all their food organically—or claim to. Some big farmers do some organic farming on the side. The man from Rodale estimates that including the part-timers there are about 10,000 organic farmers.

What comes naturally. Organic farmers use only natural, rather than chemical, fertilizers. They believe this yields healthier, tastier crops. The farmers say they are finding natural pesticides that are less dangerous, more effective, and less costly than synthetic ones.

As an alternative to DDT and other chemical pesticides, organic farmers recommend the use of beneficial insects to prey on harmful ones, insect traps, interplanting, and insect diseases.

For example, sprinkling the powder of the "milky spore disease" in the ground near crops is said to be a safe and effective way of combating Japanese beetles.

Introduction of certain pest-eating insects is regarded as considerably effective. Ladybugs, for example, are voracious eaters of aphids. And the praying mantis will gobble down just about any harmful insect.

Some organic farmers use insect traps that are as simple as a hanging cup of molasses and glue, or as sophisticated as electric lights that attract and electrocute night-flyers.

Though natural pesticides may cost less than chemical types, natural fertilizer is generally more expensive than the chemicals. This, and the higher production costs of a farmer dealing in small quantities, drives up the cost of organic foods.

Steeper prices. A special science advisor to the Secretary of USDA reported last April that health food prices were ranging from one-third to 2 times higher than regular supermarket foods. She has doubts about the relative value of organic foods. "Crops produced with the help of chemical fertilizers are equal nutritionally to crops produced by the 'organic' means," she believes.

She reasons that it makes no difference whether a fertilizer is organic or chemical, since all elements essential to plant growth enter in the inorganic form. She says of organically grown foods: "There is nothing intrinsically safe about nature."

She cautions that "safe use of pesticides is a must." According to her, the risk from bacterial contamination of foods is worse than the risk of consuming pesticide residues or food additives.

Determining whether food labeled "organically grown" is what it claims to be can be difficult. The taste and color of produce, the advisor says, is a question of freshness and maturity, not gardening method.

No Federal guidelines. A layman cannot tell by looking at an "organically grown" tomato whether that claim is true. So he may turn to the Government for help. But unless he's in Oregon at the time, the help just won't be there.

Why Oregon? In the absence of Federal guidelines on organic food labeling, it's up to the States to act, and thus far, Oregon is the only one that has.

Oregon's law, effective since last October, protects the consumer with stipulations that food labeled "organically grown" must have been raised "without synthetic pesticides, fertilizers, or chemicals; in soil in which the humus content is increased only by the addition of natural matter and in which the mineral content is increased only by the application of natural mineral fertilizers or other natural matter."

The Oregon law also controls labeling of "organically processed food," which means no synthetic additives. On meat and poultry products, a label "produced in an organic environment" implies that there was no unnecessary use of pesticides on the animals or their feed, and no exposure to antibiotics, growth stimulants, or any drug that wasn't absolutely necessary. No drug can be administered within 30 days of slaughter.

Other States that are considering similar legislation include California, Maryland, New York, and Pennsylvania.

Inefficiency cited. Organic food farming has been criticized as being inefficient, and that criticism becomes particularly serious now that the world is faced with food shortages.

But organic growers are arguing that their system done on a larger scale would be cheaper, more efficient, and provide better food. One study completed at Pennsylvania State University last year concluded that it was 40 percent cheaper to pesticize an apple orchard naturally than with chemicals—and the cost of chemical pesticides is soaring now.

Down the road. The future of health foods in America is thus difficult to forecast. It hinges on several variables.

If more States adopt labeling codes, public uncertainty about health foods might dissipate—which could lead to increased sales. And if real incomes start rising sharply again, consumers may opt for health foods regardless of their price.

If organic farmers become more efficient, the price gap between health and regular foods could narrow—and this would certainly enhance the market. Also, if the Nation's food processors were to relax their concern about safety standards, that would open the door to merchandisers of health foods.

But if these factors fail to fall into place, criticisms like those of inefficiency, high costs, and questionable nutritional value could combine to keep the industry small.

[Based on information provided by Naaman Seigle, National Economic Analysis Division, Ruth Leverton, special science advisor to USDA Secretary Butz; Raymond C. Newberry, FDA, Bureau of Foods—Division of Regulatory Guidance; and M. C. Goldman, Rodale Press, Inc.]

Economic Trends

Item	Unit or Base Period	1967	1973 Year	1973 Oct.	1974 Aug.	1974 Sept.	1974 Oct.
Prices:							
Prices received by farmers	1967=100	—	172	184	181	178	185
Crops	1967=100	—	164	180	214	211	228
Livestock and products	1967=100	—	179	188	160	154	155
Prices paid, interest, taxes and wage rates	1967=100	—	145	151	173	175	176
Family living items	1967=100	—	138	143	164	166	167
Production items	1967=100	—	146	153	178	182	183
Ratio [1]	1967=100	—	119	122	105	102	105
Wholesale prices, all commodities	1967=100	—	134.7	138.7	167.4	167.2	170.2
Industrial commodities	1967=100	—	125.9	128.5	161.6	162.9	164.8
Farm products	1967=100	—	176.3	188.4	189.2	182.7	187.5
Processed foods and feeds	1967=100	—	148.1	153.1	179.7	176.8	183.5
Consumer price index, all items	1967=100	—	133.1	136.6	149.9	151.7	153.0
Food	1967=100	—	141.4	148.4	162.8	165.0	166.1
Farm Food Market Basket: [2]							
Retail cost	1967=100	—	142.3	149.9	162.0	164.3	164.6
Farm value	1967=100	—	167.0	173.9	174.3	173.4	175.2
Farm-retail spread	1967=100	—	126.6	134.7	154.2	158.6	157.9
Farmers' share of retail cost	Percent	—	46	45	42	41	41
Farm Income: [3]							
Volume of farm marketings	1967=100	—	116	167	113	122	166
Cash receipts from farm marketings	Million dollars	42,817	88,590	11,496	7,210	7,886	11,800
Crops	Million dollars	18,434	42,346	6,782	3,577	4,383	7,700
Livestock and products	Million dollars	24,383	46,244	4,712	3,633	3,503	4,100
Realized gross income [4]	Billion dollars	49.9	97.0	—	—	102.1	—
Farm production expenses [4]	Billion dollars	38.3	64.7	—	—	76.5	—
Realized net income [4]	Billion dollars	11.6	32.2	—	—	25.6	—
Agricultural Trade:							
Agricultural exports	Million dollars	—	17,677	1,734	1,452	1,380	1,712
Agricultural imports	Million dollars	—	8,383	712	854	751	741
Land Values:							
Average value per acre	Dollars	[6]168	[7]247	—	—	—	[8]310
Total value of farm real estate	Billion dollars	[6]181.9	[7]259.5	—	—	—	[8]324.0
Gross National Product: [4]	Billion dollars	793.9	1,294.9	—	—	1,415.4	—
Consumption	Billion dollars	492.1	805.2	—	—	901.3	—
Investment	Billion dollars	116.6	209.4	—	—	205.8	—
Government expenditures	Billion dollars	180.1	276.4	—	—	312.3	—
Net exports	Billion dollars	5.2	3.9	—	—	−4.0	—
Income and Spending: [9]							
Personal income, annual rate	Billion dollars	629.3	1,055.0	1,090.8	1,167.2	1,178.0	1,185.0
Total retail sales, monthly rate	Million dollars	26,151	41,943	42,970	47,056	46,177	45,802
Retail sales of food group, monthly rate	Million dollars	5,759	8,811	9,194	10,261	10,363	10,431
Employment and Wages: [5]							
Total civilian employment	Millions	74.4	[9]84.4	[9]85.6	[9]86.2	[9]86.5	[9]86.5
Agricultural	Millions	3.8	[9]3.5	[9]3.5	[9]3.4	[9]3.5	[9]3.5
Rate of unemployment	Percent	3.8	4.9	4.6	5.4	5.8	6.0
Workweek in manufacturing	Hours	40.6	40.7	40.7	40.2	40.0	40.0
Hourly earnings in manufacturing, unadjusted	Dollars	2.83	4.07	4.14	4.44	4.53	4.56
Industrial Production: [9]	1967 = 100	—	126	127	125	126	125
Manufacturers' Shipments and Inventories: [5]							
Total shipments, monthly rate	Million dollars	46,449	71,398	74,581	85,760	85,937	88,093
Total inventories, book value end of month	Million dollars	84,655	120,870	117,224	139,727	142,975	145,062
Total new orders, monthly rate	Million dollars	46,763	73,836	77,025	90,393	87,147	86,369

[1] Ratio of index of prices received by farmers to index of prices paid, interest, taxes, and farm wage rates. [2] Average annual quantities of farm food products purchased by urban wage earner and clerical worker households (including those of single workers living alone) in 1959–61—estimated monthly. [3] Annual and quarterly data are on 50-State basis. [4] Annual rates seasonally adjusted third quarter. [5] Seasonally adjusted. [6] As of March 1, 1967. [7] As of March 1, 1973. [8] As of March 1, 1974. [9] Beginning January 1972 data not strictly comparable with prior data because of adjustment to 1970 Census data.

Sources: U.S. Dept. of Agriculture (Farm Income Situation, Marketing and Transportation Situation, Agricultural Prices, Foreign Agricultural Trade and Farm Real Estate Market Developments); U.S. Dept. of Commerce (Current Industrial Reports, Business News Reports, Monthly Retail Trade Report and Survey of Current Business); and U.S. Dept. of Labor (The Labor Force and Wholesale Price Index).

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